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SEQUENCE LISTING

A1
<110> THE JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE
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<120> GLUTAMATE TRANSPORTER ASSOCIATED PROTEINS AND METHODS OF USE THEREOF

<130> JHU1650-2

<140> US 09/695,795

<141> 2000-10-23

<150> US 60/161,007

<151> 1999-10-23

<150> US 60/206,157

<151> 2000-05-22

<160> 22

<170> PatentIn version 3.1

<210> 1

<211> 7240

<212> DNA

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gga gag cgg cgt gag cgt ctg Gly Glu Arg Arg Glu Arg Leu 1685	cag gag cac ctc agg ctg tgc cag Gln Glu His Leu Arg Leu Cys Gln 1690	agg ctg tgc cag Arg Leu Cys Gln 1695	5094
ctc cgc aga gag ctg gat gac Leu Arg Arg Glu Leu Asp Asp 1700	ctg gag cag tgg ata cag gag cga Leu Glu Gln Trp Ile Gln Glu Arg 1705	gag cag gag cga Gln Glu Arg 1710	5139
gaa gtc gtg gca gcc tcc cat Glu Val Val Ala Ala Ser His 1715	gaa ctg ggc cag gac tat gag cat Glu Leu Gly Gln Asp Tyr Glu His 1720	gac tat gag cat Asp Tyr Glu His 1725	5184
gtg act atg ctt cgg gac aaa Val Thr Met Leu Arg Asp Lys 1730	ttc cga gag ttc tcc agg gac acc Phe Arg Glu Phe Ser Arg Asp Thr 1735	gag ttc tcc agg gac acc Glu Phe Ser Arg Asp Thr 1740	5229
agc acc att ggc caa gag cgt Ser Thr Ile Gly Gln Glu Arg 1745	gta gac agt gcc aat gcc ctg gcc Val Asp Ser Ala Asn Ala Leu Ala 1750	gac aat gcc ctg gcc Ala Asn Ala Leu Ala 1755	5274

aat ggg ctc att gct ggg ggc	cat gct gca tgg gcc	acc gtg gcc	5319
Asn Gly Leu Ile Ala Gly Gly	His Ala Ala Trp Ala	Thr Val Ala	
1760	1765	1770	
gag tgg aag gac agt ctc aat	gag gcc tgg gct gac	ctg ctg gag	5364
Glu Trp Lys Asp Ser Leu Asn	Glu Ala Trp Ala Asp	Leu Leu Glu	
1775	1780	1785	
ctg ctg gac aca aga ggt cag	gtg ctg gct gct gct	tat gag ctg	5409
Leu Leu Asp Thr Arg Gly Gln	Val Leu Ala Ala Ala	Tyr Glu Leu	
1790	1795	1800	
cag cgc ttc ctg cat ggg gcc	cgc caa gcc ctg gca	cgg gtg cag	5454
Gln Arg Phe Leu His Gly Ala	Arg Gln Ala Leu Ala	Arg Val Gln	
1805	1810	1815	
cac aag cag cag cag ctt cca	gat ggg acg ggc cgc	gac ctc aat	5499
His Lys Gln Gln Gln Leu Pro	Asp Gly Thr Gly Arg	Asp Leu Asn	
1820	1825	1830	
gct gct gag gcc ctg cag cgc	cgg cac tgc gcc tat	gag cac gac	5544
Ala Ala Glu Ala Leu Gln Arg	Arg His Cys Ala Tyr	Glu His Asp	
1835	1840	1845	
atc caa gcc ctc agc act cag	gtc cag cag gtt cag	gac gat ggc	5589
Ile Gln Ala Leu Ser Thr Gln	Val Gln Gln Val Gln	Asp Asp Gly	
1850	1855	1860	
ctc agg cta caa aag gcc tat	gct gga gac aag gct	gag gaa att	5634
Leu Arg Leu Gln Lys Ala Tyr	Ala Gly Asp Lys Ala	Glu Glu Ile	
1865	1870	1875	
ggc cgt cac atg cag gca gtg	gct gag gcg tgg gcc	cag ctc cag	5679
Gly Arg His Met Gln Ala Val	Ala Glu Ala Trp Ala	Gln Leu Gln	
1880	1885	1890	
gga agt tct gct gcc cgt cgc	cag ctg tta ctg gat	acc aca gac	5724
Gly Ser Ser Ala Ala Arg Arg	Gln Leu Leu Leu Asp	Thr Thr Asp	
1895	1900	1905	
aaa ttc cga ttc ttc aag gct	gtc cgg gag ttg atg	ctg tgg atg	5769
Lys Phe Arg Phe Phe Lys Ala	Val Arg Glu Leu Met	Leu Trp Met	
1910	1915	1920	
gat ggg att aac ctg cag atg	gat gcc cag gag agg	ccc cgg gat	5814
Asp Gly Ile Asn Leu Gln Met	Asp Ala Gln Glu Arg	Pro Arg Asp	
1925	1930	1935	
gtg tcc tct gca gat tta gtc	atc aaa aac caa caa	ggc atc aaa	5859
Val Ser Ser Ala Asp Leu Val	Ile Lys Asn Gln Gln	Gly Ile Lys	
1940	1945	1950	
gca gag ata gag gca aga gct	gac agg ttc tcc gcc	tgc att gac	5904
Ala Glu Ile Glu Ala Arg Ala	Asp Arg Phe Ser Ala	Cys Ile Asp	
1955	1960	1965	
atg ggg caa gag ctg ctg gcc	cgg aac cac tat gcc	gct gag gag	5949
Met Gly Gln Glu Leu Leu Ala	Arg Asn His Tyr Ala	Ala Glu Glu	
1970	1975	1980	

atc tca gag aag ctg tct cag	cta cag tcc cgg cgc	cag gag aca	5994
Ile Ser Glu Lys Leu Ser Gln	Leu Gln Ser Arg Arg	Gln Glu Thr	
1985	1990	1995	
gct gaa aag tgg cag gag aag	atg gac tgg cta cag	ctt gtt ttg	6039
Ala Glu Lys Trp Gln Glu Lys	Met Asp Trp Leu Gln	Leu Val Leu	
2000	2005	2010	
gag gtg ctt gtg ttt ggg aga	gat gca ggc atg gca	gag gcc tgg	6084
Glu Val Leu Val Phe Gly Arg	Asp Ala Gly Met Ala	Glu Ala Trp	
2015	2020	2025	
cta tgc agt cag gag cca ttg	gtg cga agt gca gaa	ctg ggt tgc	6129
Leu Cys Ser Gln Glu Pro Leu	Val Arg Ser Ala Glu	Leu Gly Cys	
2030	2035	2040	
act gtg gat gaa gta gag agc	ctc atc aag cgg cat	gaa gcc ttc	6174
Thr Val Asp Glu Val Glu Ser	Leu Ile Lys Arg His	Glu Ala Phe	
2045	2050	2055	
cag aag tca gca gtg gcc tgg	gag gag cgt ttc agt	gcc ctg gag	6219
Gln Lys Ser Ala Val Ala Trp	Glu Glu Arg Phe Ser	Ala Leu Glu	
2060	2065	2070	
aag ctc act gcg ctg gaa gag	cgg gag aat gag cag	aaa agg aag	6264
Lys Leu Thr Ala Leu Glu Glu	Arg Glu Asn Glu Gln	Lys Arg Lys	
2075	2080	2085	
agg gag gag gag gaa cga agg	aaa cag ccc cct act	tca gag ccc	6309
Arg Glu Glu Glu Glu Arg Arg	Lys Gln Pro Pro Thr	Ser Glu Pro	
2090	2095	2100	
atg gct agt caa ccg gaa ggg	agt ctg gta gat ggc	cag aga gtt	6354
Met Ala Ser Gln Pro Glu Gly	Ser Leu Val Asp Gly	Gln Arg Val	
2105	2110	2115	
ctt gac act gcc tgg gat ggg	acc cag tca aaa ttg	cca cca tcc	6399
Leu Asp Thr Ala Trp Asp Gly	Thr Gln Ser Lys Leu	Pro Pro Ser	
2120	2125	2130	
aca caa gca ccc agc att aat	ggg gtc tgc acg gac	acg gag tcc	6444
Thr Gln Ala Pro Ser Ile Asn	Gly Val Cys Thr Asp	Thr Glu Ser	
2135	2140	2145	
tca cag cct ctg ttg gaa cag	caa aga ctt gaa cag	agc aat gtc	6489
Ser Gln Pro Leu Leu Glu Gln	Gln Arg Leu Glu Gln	Ser Asn Val	
2150	2155	2160	
cca gaa ggg cct gga tct ggc	aca gga gac gag tcc	agc ggg ccc	6534
Pro Glu Gly Pro Gly Ser Gly	Thr Gly Asp Glu Ser	Ser Gly Pro	
2165	2170	2175	
cgg gga gag agg cag acc ctg	ccc cgg ggc cct gct	ccg tct cca	6579
Arg Gly Glu Arg Gln Thr Leu	Pro Arg Gly Pro Ala	Pro Ser Pro	
2180	2185	2190	
atg ccc cag agc aga tcg tct	gag tca gct cat gtt	gcc acc ctg	6624
Met Pro Gln Ser Arg Ser Ser	Glu Ser Ala His Val	Ala Thr Leu	
2195	2200	2205	
ccc gca cga ggt gct gag ctc	tct gct cag gaa cag	atg gaa ggg	6669

Pro Ala Arg Gly Ala Glu Leu Ser Ala Gln Glu Gln Met Glu Gly	
2210 2215 2220	
acg ctg tgc cgc aaa cag gag atg gaa gcc ttc aat aag aaa gct	6714
Thr Leu Cys Arg Lys Gln Glu Met Glu Ala Phe Asn Lys Lys Ala	
2225 2230 2235	
gcc aac agg tcc tgg cag aat gtg tac tgt gta ctt cgg cgt gga	6759
Ala Asn Arg Ser Trp Gln Asn Val Tyr Cys Val Leu Arg Arg Gly	
2240 2245 2250	
agc ctc ggc ttt tac aag gat gcc agg gca gct agt gca gga gtg	6804
Ser Leu Gly Phe Tyr Lys Asp Ala Arg Ala Ala Ser Ala Gly Val	
2255 2260 2265	
cca tac cat gga gaa gtg cct gtc agt ctg gcc agg gcc cag ggc	6849
Pro Tyr His Gly Glu Val Pro Val Ser Leu Ala Arg Ala Gln Gly	
2270 2275 2280	
agt gtg gcc ttt gat tat cgg aaa cgc aaa cat gtc ttc aag ctg	6894
Ser Val Ala Phe Asp Tyr Arg Lys Arg Lys His Val Phe Lys Leu	
2285 2290 2295	
ggc ttg cag gat ggg aaa gag tat cta ttc cag gcc aag gat gag	6939
Gly Leu Gln Asp Gly Lys Glu Tyr Leu Phe Gln Ala Lys Asp Glu	
2300 2305 2310	
gca gag atg agc tca tgg ctg aga gtg gtg aat gca gcc att gcc	6984
Ala Glu Met Ser Ser Trp Leu Arg Val Val Asn Ala Ala Ile Ala	
2315 2320 2325	
act gcg tcc tcg gcc tct gga gag cca gaa gag cca gtg gtg ccc	7029
Thr Ala Ser Ser Ala Ser Gly Glu Pro Glu Glu Pro Val Val Pro	
2330 2335 2340	
agt gcc agc cgg ggt ctg acc agg gcc atg acc atg ccc cca gtg	7074
Ser Ala Ser Arg Gly Leu Thr Arg Ala Met Thr Met Pro Pro Val	
2345 2350 2355	
tca cag cct gag ggc tcc atc gtg ctt cgc agc aag gat ggc aga	7119
Ser Gln Pro Glu Gly Ser Ile Val Leu Arg Ser Lys Asp Gly Arg	
2360 2365 2370	
gaa aga gag cga gaa aaa cga ttc agc ttc ttt aag aag aac aag	7164
Glu Arg Glu Arg Glu Lys Arg Phe Ser Phe Phe Lys Lys Asn Lys	
2375 2380 2385	
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gtcgacagag accacc	7240

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 <211> 2388
 <212> PRT
 <213> Rattus

<400> 2

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1 5 10 15

Gly Gln Tyr Ser Asp Ile Asn Asn Arg Trp Asp Leu Pro Asp Ser Asp
20 25 30

Trp Asp Asn Asp Ser Ser Ser Ala Arg Leu Phe Glu Arg Ser Arg Ile
35 40 45

Lys Ala Leu Ala Asp Glu Arg Glu Ala Val Gln Lys Lys Thr Phe Thr
50 55 60

Lys Trp Val Asn Ser His Leu Ala Arg Val Thr Cys Arg Val Gly Asp
65 70 75 80

Leu Tyr Ser Asp Leu Arg Asp Gly Arg Asn Leu Leu Arg Leu Leu Glu
85 90 95

Val Leu Ser Gly Glu Thr Leu Pro Lys Pro Thr Lys Gly Arg Met Arg
100 105 110

Ile His Cys Leu Glu Asn Val Asp Lys Ala Leu Gln Phe Leu Lys Glu
115 120 125

Gln Lys Val His Leu Glu Asn Met Gly Ser His Asp Ile Val Asp Gly
130 135 140

Asn His Arg Leu Thr Leu Gly Leu Val Trp Thr Ile Ile Leu Arg Phe
145 150 155 160

Gln Ile Gln Asp Ile Ser Val Glu Thr Glu Asp Asn Lys Glu Lys Lys
165 170 175

Ser Ala Lys Asp Ala Leu Leu Leu Trp Cys Gln Met Lys Thr Ala Gly
180 185 190

Tyr Pro Asn Val Asn Val His Asn Phe Thr Thr Ser Trp Arg Asp Gly
195 200 205

Leu Ala Phe Asn Ala Ile Val His Lys His Arg Pro Asp Leu Leu Asp
210 215 220

Phe Glu Ser Leu Lys Lys Cys Asn Ala His Tyr Asn Leu Gln Asn Ala
225 230 235 240

Phe Asn Leu Ala Glu Lys Glu Leu Gly Leu Thr Lys Leu Leu Asp Pro
245 250 255

Glu Asp Val Asn Val Asp Gln Pro Asp Glu Lys Ser Ile Ile Thr Tyr
 260 265 270

Val Ala Thr Tyr Tyr His Tyr Phe Ser Lys Met Lys Ala Leu Ala Val
 275 280 285

Glu Gly Lys Arg Ile Gly Lys Val Leu Asp His Ala Met Glu Ala Glu
 290 295 300

His Leu Val Glu Lys Tyr Glu Ser Leu Ala Ser Glu Leu Leu Gln Trp
 305 310 315 320

Ile Glu Gln Thr Ile Gly Thr Phe Asn Asp Arg Gln Leu Ala Asn Ser
 325 330 335

Leu Ser Gly Val Gln Asn Gln Leu Gln Ser Phe Asn Ser Tyr Arg Thr
 340 345 350

Val Glu Lys Pro Pro Lys Phe Thr Glu Lys Gly Asn Leu Glu Val Leu
 355 360 365

Leu Phe Thr Ile Gln Ser Lys Leu Arg Ala Asn Asn Gln Lys Val Tyr
 370 375 380

Thr Pro Arg Glu Gly Arg Leu Ile Ser Asp Ile Asn Lys Ala Trp Glu
 385 390 395 400

Arg Leu Glu Lys Ala Glu His Glu Arg Glu Leu Ala Leu Arg Thr Glu
 405 410 415

Leu Ile Arg Gln Glu Lys Leu Glu Gln Leu Ala Ala Arg Phe Asp Arg
 420 425 430

Lys Ala Ala Met Arg Glu Thr Trp Leu Ser Glu Asn Gln Arg Leu Val
 435 440 445

Ser Gln Asp Asn Phe Gly Leu Glu Leu Ala Ala Val Glu Ala Ala Val
 450 455 460

Arg Lys His Glu Ala Ile Glu Thr Asp Ile Val Ala Tyr Ser Gly Arg
 465 470 475 480

Val Gln Ala Val Asp Ala Val Ala Ala Glu Leu Ala Ala Glu His Tyr
 485 490 495

His Asp Ile Lys Arg Ile Ala Ala Arg Gln Asn Asn Val Ala Arg Leu
500 505 510

Trp Asp Phe Leu Arg Glu Met Val Ala Ala Arg Arg Glu Arg Leu Leu
515 520 525

Leu Asn Leu Glu Leu Gln Lys Val Phe Gln Asp Leu Leu Tyr Leu Met
530 535 540

Asp Trp Met Ala Glu Met Lys Gly Arg Leu Gln Ser Gln Asp Leu Gly
545 550 555 560

Lys His Leu Ala Gly Val Glu Asp Leu Leu Gln Leu His Glu Leu Val
565 570 575

Glu Ala Asp Ile Ala Val Gln Ala Glu Arg Val Arg Ala Val Ser Ala
580 585 590

Ser Ala Leu Arg Phe Cys Asp Pro Gly Lys Glu Tyr Arg Pro Cys Gly
595 600 605

Pro Gln Leu Val Ser Glu Arg Val Ala Thr Leu Glu Gln Ser Tyr Glu
610 615 620

Ala Leu Cys Glu Leu Ala Ala Thr Arg Arg Ala Arg Leu Glu Glu Ser
625 630 635 640

Arg Arg Leu Trp Arg Phe Leu Trp Glu Val Gly Glu Ala Glu Ala Trp
645 650 655

Val Arg Glu Gln Gln His Leu Leu Ala Ser Ala Glu Thr Gly Arg Asp
660 665 670

Leu Thr Gly Val Leu Arg Leu Leu Asn Lys His Thr Ala Leu Arg Gly
675 680 685

Glu Met Ser Gly Arg Leu Gly Pro Leu Lys Leu Thr Leu Glu Gln Gly
690 695 700

Gln Gln Leu Val Ala Glu Gly His Pro Gly Ala Asn Gln Ala Ser Thr
705 710 715 720

Arg Ala Ala Glu Leu Gln Ala Gln Trp Glu Arg Leu Glu Ala Leu Ala
725 730 735

Glu Glu Arg Ala Gln Arg Leu Ala Gln Ala Ala Ser Leu Tyr Gln Phe

740	745	750
Gln Ala Asp Ala Asn Asp Met	Glu Ala Trp Leu Val	Asp Ala Leu Arg
755	760	765
Leu Val Ser Ser Pro Glu Val Gly His Asp Glu Phe Ser Thr Gln Ala		
770	775	780
Leu Ala Arg Gln His Arg Ala Leu Glu Glu Glu Ile Arg Ala His Arg		
785	790	795
Pro Thr Leu Asp Ala Leu Arg Glu Gln Ala Ala Ala Leu Pro Pro Ala		
805	810	815
Leu Ser His Thr Pro Glu Val Gln Gly Arg Val Pro Thr Leu Glu Gln		
820	825	830
His Tyr Glu Glu Leu Gln Ala Arg Ala Gly Glu Arg Ala Arg Ala Leu		
835	840	845
Glu Ala Ala Leu Ala Phe Tyr Thr Met Leu Ser Glu Ala Gly Ala Cys		
850	855	860
Gly Leu Trp Val Glu Glu Lys Glu Gln Trp Leu Asn Gly Leu Ala Leu		
865	870	875
Pro Glu Arg Leu Glu Asp Pro Glu Val Val Gln Gln Arg Phe Glu Thr		
885	890	895
Leu Glu Pro Glu Met Asn Ala Leu Ala Ala Arg Ile Thr Ala Val Ser		
900	905	910
Asp Ile Ala Glu Gln Leu Leu Lys Ala Ser Pro Pro Gly Lys Asp Arg		
915	920	925
Ile Ile Gly Thr Gln Glu Gln Leu Asn Gln Arg Trp Gln Gln Phe Arg		
930	935	940
Ser Leu Ala Gly Gly Lys Lys Ala Ala Leu Thr Ser Ala Leu Ser Ile		
945	950	955
Gln Asn Tyr His Leu Glu Cys Thr Glu Thr Gln Ala Trp Met Arg Glu		
965	970	975
Lys Thr Lys Val Ile Glu Ser Thr Gln Asp Leu Gly Asn Asp Leu Ala		
980	985	990

Gly Val Leu Ala Leu Gln Arg Lys Leu Ala Gly Thr Glu Arg Asp Leu
 995 1000 1005

Glu Ala Ile Ser Ala Arg Val Gly Glu Leu Thr Gln Glu Ala Asn
 1010 1015 1020

Ala Leu Ala Ala Gly His Pro Ala Gln Ala Pro Ala Ile Asn Thr
 1025 1030 1035

Arg Leu Gly Glu Val Gln Thr Gly Trp Glu Asp Leu Arg Ala Thr
 1040 1045 1050

Met Arg Arg Arg Glu Glu Ser Leu Gly Glu Ala Arg Arg Leu Gln
 1055 1060 1065

Asp Phe Leu Arg Ser Leu Asp Asp Phe Gln Ala Trp Leu Gly Arg
 1070 1075 1080

Thr Gln Thr Ala Val Ala Ser Glu Glu Gly Pro Ala Thr Leu Pro
 1085 1090 1095

Glu Ala Glu Ala Leu Leu Ala Gln His Ala Ala Leu Arg Gly Glu
 1100 1105 1110

Val Glu Arg Ala Gln Ser Glu Tyr Ser Arg Leu Arg Thr Leu Gly
 1115 1120 1125

Glu Glu Val Thr Arg Asp Gln Ala Asp Pro Gln Cys Leu Phe Leu
 1130 1135 1140

Arg Gln Arg Leu Glu Ala Leu Gly Thr Gly Trp Glu Glu Leu Gly
 1145 1150 1155

Arg Met Trp Glu Ser Arg Gln Gly Arg Leu Ala Gln Ala His Gly
 1160 1165 1170

Phe Gln Gly Phe Leu Arg Asp Ala Arg Gln Ala Glu Gly Val Leu
 1175 1180 1185

Ser Ser Gln Glu Tyr Val Leu Ser His Thr Glu Met Pro Gly Thr
 1190 1195 1200

Leu Gln Ala Ala Asp Ala Ala Ile Lys Lys Leu Glu Asp Phe Met
 1205 1210 1215

Ser	Thr	Met	Asp	Ala	Asn	Gly	Glu	Arg	Ile	Arg	Gly	Leu	Leu	Glu
1220						1225					1230			
Ala	Gly	Arg	Gln	Leu	Val	Ser	Lys	Gly	Asn	Ile	His	Ala	Glu	Lys
1235						1240					1245			
Ile	Gln	Glu	Lys	Ala	Asp	Ser	Ile	Glu	Lys	Arg	His	Arg	Lys	Asn
1250						1255					1260			
Gln	Glu	Ala	Val	Gln	Gln	Leu	Leu	Gly	Arg	Leu	Arg	Asp	Asn	Arg
1265						1270					1275			
Glu	Gln	Gln	His	Phe	Leu	Gln	Asp	Cys	Gln	Glu	Leu	Lys	Leu	Trp
1280						1285					1290			
Ile	Asp	Glu	Lys	Met	Leu	Thr	Ala	Gln	Asp	Val	Ser	Tyr	Asp	Glu
1295						1300					1305			
Ala	Arg	Asn	Leu	His	Thr	Lys	Trp	Gln	Lys	His	Gln	Ala	Phe	Met
1310						1315					1320			
Ala	Glu	Leu	Ala	Ala	Asn	Lys	Asp	Trp	Leu	Asp	Lys	Val	Asp	Lys
1325						1330					1335			
Glu	Gly	Arg	Glu	Leu	Thr	Leu	Glu	Lys	Pro	Glu	Leu	Lys	Val	Leu
1340						1345					1350			
Val	Ser	Glu	Lys	Leu	Glu	Asp	Leu	His	Arg	Arg	Trp	Asp	Glu	Leu
1355						1360					1365			
Glu	Thr	Thr	Thr	Gln	Ala	Lys	Ala	Arg	Ser	Leu	Phe	Asp	Ala	Asn
1370						1375					1380			
Arg	Ala	Glu	Leu	Phe	Ala	Gln	Ser	Cys	Ser	Ala	Leu	Glu	Ser	Trp
1385						1390					1395			
Leu	Glu	Ser	Leu	Gln	Ala	Gln	Leu	His	Ser	Asp	Asp	Tyr	Gly	Lys
1400						1405					1410			
Asp	Leu	Thr	Ser	Val	Asn	Ile	Leu	Leu	Lys	Lys	Gln	Gln	Met	Leu
1415						1420					1425			
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1430						1435					1440			

Ala Gln	Ala Lys	Ala Leu	Ala	Gln Glu	Asp Gln	Ser	Ala Gly	Glu	
1445			1450			1455			
Val Glu	Arg Thr	Ser Arg	Ala	Val Glu	Glu Lys	Phe	Arg Ala	Leu	
1460			1465			1470			
Cys Gln	Pro Met	Lys Asp	Arg	Cys Arg	Arg Leu	Gln	Ala Ser	Arg	
1475			1480			1485			
Glu Gln	His Gln	Phe His	Arg	Asp Val	Glu Asp	Glu	Ile Leu	Trp	
1490			1495			1500			
Val Thr	Glu Arg	Leu Pro	Met	Ala Ser	Ser Leu	Glu	His Gly	Lys	
1505			1510			1515			
Asp Leu	Pro Ser	Val Gln	Leu	Leu Met	Lys Lys	Asn	Gln Thr	Leu	
1520			1525			1530			
Gln Lys	Glu Ile	Gln Gly	His	Glu Pro	Arg Ile	Ala	Asp Leu	Lys	
1535			1540			1545			
Glu Arg	Gln Arg	Thr Leu	Arg	Thr Ala	Ala Ala	Gly	Pro Glu	Leu	
1550			1555			1560			
Ala Glu	Leu Gln	Glu Met	Trp	Lys Arg	Leu Ser	His	Glu Leu	Glu	
1565			1570			1575			
Leu Arg	Gly Lys	Arg Leu	Glu	Glu Ala	Leu Arg	Ala	Gln Gln	Phe	
1580			1585			1590			
Tyr Arg	Asp Ala	Ala Glu	Ala	Glu Ala	Trp Met	Gly	Glu Gln	Glu	
1595			1600			1605			
Leu His	Met Met	Gly Gln	Glu	Lys Ala	Lys Asp	Glu	Leu Ser	Ala	
1610			1615			1620			
Gln Ala	Glu Val	Lys Lys	His	Gln Val	Leu Glu	Gln	Ala Leu	Ala	
1625			1630			1635			
Asp Tyr	Ala Gln	Thr Ile	Lys	Gln Leu	Ala Ala	Ser	Ser Gln	Asp	
1640			1645			1650			
Met Ile	Asp His	Glu His	Pro	Glu Ser	Thr Arg	Leu	Thr Ile	Arg	
1655			1660			1665			
Gln Ala	Gln Val	Asp Lys	Leu	Tyr Ala	Gly Leu	Lys	Glu Leu	Ala	

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Gly Glu Arg Arg Glu Arg Leu Gln Glu His Leu Arg Leu Cys Gln				
1685		1690		1695
Leu Arg Arg Glu Leu Asp Asp Leu Glu Gln Trp Ile Gln Glu Arg				
1700		1705		1710
Glu Val Val Ala Ala Ser His Glu Leu Gly Gln Asp Tyr Glu His				
1715		1720		1725
Val Thr Met Leu Arg Asp Lys Phe Arg Glu Phe Ser Arg Asp Thr				
1730		1735		1740
Ser Thr Ile Gly Gln Glu Arg Val Asp Ser Ala Asn Ala Leu Ala				
1745		1750		1755
Asn Gly Leu Ile Ala Gly Gly His Ala Ala Trp Ala Thr Val Ala				
1760		1765		1770
Glu Trp Lys Asp Ser Leu Asn Glu Ala Trp Ala Asp Leu Leu Glu				
1775		1780		1785
Leu Leu Asp Thr Arg Gly Gln Val Leu Ala Ala Ala Tyr Glu Leu				
1790		1795		1800
Gln Arg Phe Leu His Gly Ala Arg Gln Ala Leu Ala Arg Val Gln				
1805		1810		1815
His Lys Gln Gln Gln Leu Pro Asp Gly Thr Gly Arg Asp Leu Asn				
1820		1825		1830
Ala Ala Glu Ala Leu Gln Arg Arg His Cys Ala Tyr Glu His Asp				
1835		1840		1845
Ile Gln Ala Leu Ser Thr Gln Val Gln Gln Val Gln Asp Asp Gly				
1850		1855		1860
Leu Arg Leu Gln Lys Ala Tyr Ala Gly Asp Lys Ala Glu Glu Ile				
1865		1870		1875
Gly Arg His Met Gln Ala Val Ala Glu Ala Trp Ala Gln Leu Gln				
1880		1885		1890
Gly Ser Ser Ala Ala Arg Arg Gln Leu Leu Leu Asp Thr Thr Asp				
1895		1900		1905

Lys Phe	Arg Phe Phe	Lys Ala	Val Arg Glu Leu	Met	Leu Trp Met
1910		1915		1920	
Asp Gly	Ile Asn Leu Gln	Met	Asp Ala Gln Glu	Arg	Pro Arg Asp
1925		1930		1935	
Val Ser	Ser Ala Asp Leu	Val	Ile Lys Asn Gln	Gln	Gly Ile Lys
1940		1945		1950	
Ala Glu	Ile Glu Ala Arg	Ala	Asp Arg Phe Ser	Ala	Cys Ile Asp
1955		1960		1965	
Met Gly	Gln Glu Leu Leu	Ala	Arg Asn His Tyr	Ala	Ala Glu Glu
1970		1975		1980	
Ile Ser	Glu Lys Leu Ser	Gln	Leu Gln Ser Arg	Arg	Gln Glu Thr
1985		1990		1995	
Ala Glu	Lys Trp Gln Glu	Lys	Met Asp Trp Leu	Gln	Leu Val Leu
2000		2005		2010	
Glu Val	Leu Val Phe Gly	Arg	Asp Ala Gly Met	Ala	Glu Ala Trp
2015		2020		2025	
Leu Cys	Ser Gln Glu Pro	Leu	Val Arg Ser Ala	Glu	Leu Gly Cys
2030		2035		2040	
Thr Val	Asp Glu Val Glu	Ser	Leu Ile Lys Arg	His	Glu Ala Phe
2045		2050		2055	
Gln Lys	Ser Ala Val Ala	Trp	Glu Glu Arg Phe	Ser	Ala Leu Glu
2060		2065		2070	
Lys Leu	Thr Ala Leu Glu	Glu	Arg Glu Asn Glu	Gln	Lys Arg Lys
2075		2080		2085	
Arg Glu	Glu Glu Glu Arg	Arg	Lys Gln Pro Pro	Thr	Ser Glu Pro
2090		2095		2100	
Met Ala	Ser Gln Pro Glu	Gly	Ser Leu Val Asp	Gly	Gln Arg Val
2105		2110		2115	
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Arg	Gly	Glu	Arg	Gln	Thr	Leu	Pro	Arg	Gly	Pro	Ala	Pro	Ser	Pro
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Thr	Leu	Cys	Arg	Lys	Gln	Glu	Met	Glu	Ala	Phe	Asn	Lys	Lys	Ala
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Ala	Asn	Arg	Ser	Trp	Gln	Asn	Val	Tyr	Cys	Val	Leu	Arg	Arg	Gly
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Ser	Leu	Gly	Phe	Tyr	Lys	Asp	Ala	Arg	Ala	Ala	Ser	Ala	Gly	Val
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Pro	Tyr	His	Gly	Glu	Val	Pro	Val	Ser	Leu	Ala	Arg	Ala	Gln	Gly
2270						2275					2280			
Ser	Val	Ala	Phe	Asp	Tyr	Arg	Lys	Arg	Lys	His	Val	Phe	Lys	Leu
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Gly	Leu	Gln	Asp	Gly	Lys	Glu	Tyr	Leu	Phe	Gln	Ala	Lys	Asp	Glu
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2315						2320					2325			
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2330						2335					2340			
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 Gln Ser His Leu Ser Ser Pro Ile Ala Ser Trp Leu Ser Ser Leu Ser
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 Ser Leu Gly Asp Ser Thr Pro Glu Arg Thr Ser Pro Ser His His Arg
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 Gln Pro Ser Asp Thr Ser Glu Thr Thr Ala Gly Leu Val Gln Arg Cys
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 Asp Arg Ile Val Leu Val Gln Ser Val Arg Pro Gly Gly Ala Ala Met
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Val Ile Ile Gln Lys Asp Gln His Gly Phe Gly Phe Thr Val Ser Gly
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Val Asn Pro Ile Ile Pro Pro Pro Pro Pro Pro Pro Pro Leu Pro Pro
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Pro Gln His Ile Thr Gly Pro Lys Pro Leu Gln Asp Pro Glu Val Gln
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Lys His Ala Thr Gln Ile Leu Trp Asn Met Leu Arg Gln Glu Glu Glu
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Cys Glu Gly Arg Leu Ser Val Asp Ser Gln Glu Ala Asp Ser Gly Leu
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Pro Val Ile Leu Ala Arg Val Ala Gln His His Arg Arg Gln Gly Ser

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His Pro Ala Tyr Leu Val Val Phe Leu Arg Tyr Ile Leu Ser Gln Ala		
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Thr Asn Pro Lys Asp Ser Arg Ser Leu Gly Lys Asp Ile Trp Asn Ile		
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Tyr Glu Glu Asp Arg Ser Ala Pro Met Asp Phe Ala Val Asn Thr Phe		
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Met Ser His Ala Gly Ile Arg Leu Arg Glu Ser Arg Ser Ser Cys Thr		
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Ala Glu Lys Thr Gln Ser Ala Pro Asp Lys Asp Lys Trp Leu Pro Phe		
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Phe Pro Lys Thr Lys Lys Gln Ser Ser Asn Ser Lys Lys Glu Lys Asp
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Ala Leu Glu Asp Lys Lys Arg Asn Pro Ile Leu Arg Tyr Ile Gly Lys
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Pro Lys Ser Ser Ser Gln Ser Ile Lys Pro Gly Asn Val Arg Asn Ile
 565 570 575

Ile Gln His Phe Glu Asn Ser His Gln Tyr Asp Val Pro Glu Pro Gly
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Thr Gln Arg Leu Ser Thr Gly Ser Phe Pro Glu Asp Leu Leu Glu Ser
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Asp Ser Ser Arg Ser Glu Ile Arg Leu Gly Arg Ser Gly Ser Leu Lys
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Gly Arg Glu Glu Met Lys Arg Ser Arg Lys Ala Glu Asn Val Pro Arg
 625 630 635 640

Pro Arg Ser Asp Val Asp Met Asp Ala Ala Ala Glu Ala Ala Arg Leu
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His Gln Ser Ala Ser Ser Ser Ala Ser Ser Leu Ser Thr Arg Ser Leu
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Glu Asn Pro Thr Pro Pro Phe Thr Pro Lys Met Gly Arg Arg Ser Ile
 675 680 685

Glu Ser Pro Asn Leu Gly Phe Cys Thr Asp Val Ile Leu Pro His Leu
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Leu Glu Asp Asp Leu Gly Gln Leu Ser Asp Leu Glu Pro Glu Pro Glu
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Val Gln Asn Trp Gln His Thr Val Gly Lys Asp Val Val Ala Asn Leu
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Thr Gln Arg Glu Ile Asp Arg Gln Glu Val Ile Asn Glu Leu Phe Val
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Thr Glu Ala Ser His Leu Arg Thr Leu Arg Val Leu Asp Leu Ile Phe
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Tyr Gln Arg Met Arg Lys Glu Asn Leu Met Pro Arg Glu Glu Leu Ala
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Arg Leu Phe Pro Asn Leu Pro Glu Leu Ile Glu Ile His Asn Ser Trp
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Cys Glu Ala Met Lys Lys Leu Arg Glu Glu Gly Pro Ile Ile Arg Asp
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Ile Ser Asp Pro Met Leu Ala Arg Phe Asp Gly Pro Ala Arg Glu Glu
 820 825 830

Leu Gln Gln Val Ala Ala Gln Phe Cys Ser Tyr Gln Ser Val Ala Leu
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Glu Leu Ile Arg Thr Lys Gln Arg Lys Glu Ser Arg Phe Gln Leu Phe
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Met Gln Glu Ala Glu Ser His Pro Gln Cys Arg Arg Leu Gln Leu Arg
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Asp Leu Ile Val Ser Glu Met Gln Arg Leu Thr Lys Tyr Pro Leu Leu
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Leu Glu Asn Ile Ile Lys His Thr Glu Gly Gly Thr Ser Glu His Glu
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Lys Leu Cys Arg Ala Arg Asp Gln Cys Arg Glu Ile Leu Lys Phe Val
 915 920 925

Asn Glu Ala Val Lys Gln Thr Glu Asn Arg His Arg Leu Glu Gly Tyr
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Gln Lys Arg Leu Asp Ala Thr Ala Leu Glu Arg Ala Ser Asn Pro Leu
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Ala Ala Glu Phe Lys Ser Leu Asp Leu Thr Thr Arg Lys Met Ile His
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Glu Gly Pro Leu Thr Trp Arg Ile Ser Lys Asp Lys Thr Leu Asp Leu
 980 985 990

Gln Val Leu Leu Leu Glu Asp Leu Val Val Leu Leu Gln Arg Gln Glu
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Val Leu	Ile Arg Ser Val	Ala	Thr Asp Lys Arg	Ala	Phe Phe Ile
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Ile Cys	Thr Ser Glu Leu	Gly	Pro Pro Gln Ile	Tyr	Glu Leu Val
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Ala Leu	Thr Ser Ser Asp	Lys	Asn Ile Trp Met	Glu	Leu Leu Glu
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Glu Ala	Val Gln Asn Ala	Thr	Lys His Pro Gly	Ala	Ala Pro Ile
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Pro Ile	His Pro Ser Pro	Pro	Gly Ser Gln Glu	Pro	Ala Tyr Gln
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Gly Ser	Thr Ser Ser Arg	Val	Glu Ile Asn Asp	Ser	Glu Val Tyr
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His Thr	Glu Lys Glu Pro	Lys	Lys Leu Pro Glu	Gly	Pro Gly Pro
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Pro Val	Leu Leu Ala Leu	Thr	Gly Pro Leu Leu	Met	Glu Gly Leu
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 Gly Ser Asp Arg Phe Ala Arg Pro Asp Phe Arg Asp Ile Ser Lys Trp
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 Asn Asn Arg Val Val Ser Asn Leu Leu Tyr Tyr Gln Thr Asn Tyr Leu
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 gtg gtg gct gcc atg atg att tca gtc gtt ggg ttt ctg agc ccc ttc 192
 Val Val Ala Ala Met Met Ile Ser Val Val Gly Phe Leu Ser Pro Phe
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 Asn Met Ile Leu Gly Gly Ile Ile Val Val Leu Val Phe Thr Gly Phe
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 Val Trp Ala Ala His Asn Lys Asp Ile Leu Arg Arg Met Lys Lys Gln
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 tac cca acg gcc ttt gtc atg gtg gtc atg cta gcc agc tac ttc ctc 336
 Tyr Pro Thr Ala Phe Val Met Val Val Met Leu Ala Ser Tyr Phe Leu
 100 105 110
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 Ile Ser Met Phe Gly Gly Val Met Val Phe Val Phe Gly Ile Thr Phe
 115 120 125

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 Pro Leu Leu Leu Met Phe Ile His Ala Ser Leu Arg Leu Arg Asn Leu
 130 135 140

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 Lys Asn Lys Leu Glu Asn Lys Met Glu Gly Ile Gly Leu Lys Lys Thr
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 35 40 45

Val Val Ala Ala Met Met Ile Ser Val Val Gly Phe Leu Ser Pro Phe
 50 55 60

Asn Met Ile Leu Gly Gly Ile Ile Val Val Leu Val Phe Thr Gly Phe
 65 70 75 80

Val Trp Ala Ala His Asn Lys Asp Ile Leu Arg Arg Met Lys Lys Gln
 85 90 95

Tyr Pro Thr Ala Phe Val Met Val Val Met Leu Ala Ser Tyr Phe Leu
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Ile Ser Met Phe Gly Gly Val Met Val Phe Val Phe Gly Ile Thr Phe
 115 120 125

Pro Leu Leu Leu Met Phe Ile His Ala Ser Leu Arg Leu Arg Asn Leu
 130 135 140

Lys Asn Lys Leu Glu Asn Lys Met Glu Gly Ile Gly Leu Lys Lys Thr

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Gln Ile Gly Leu Asp Glu Ser Gly Gly Gly Gly Gly Met Thr Leu Gly
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gaa gct ccc acc cgt gtt gcc cct ggg gaa ctt cgc tct att cgg ggc 433
Glu Ala Pro Thr Arg Val Ala Pro Gly Glu Leu Arg Ser Ile Arg Gly
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cca ctc agc tct gca cca ggtctacctg gggtttcccag tctgctctag 481
Pro Leu Ser Ser Ala Pro
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Glu Ile Val His Glu
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gaa gaa ggg gca ccc tgc act gct atc cgg gaa gta tcc ctg ctt aag Glu Glu Gly Ala Pro Cys Thr Ala Ile Arg Glu Val Ser Leu Leu Lys 205 210 215	1029
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cag tac ctg gat gac tgt gga aat gtc atc aac atg cac aat gtg aaa Gln Tyr Leu Asp Asp Cys Gly Asn Val Ile Asn Met His Asn Val Lys 250 255 260	1173
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Met Trp Gly Val Gly Cys Ile Phe Tyr Glu Met Ala Thr Gly Arg Pro	
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gaa gag ttt aga aca tac aac tac ccc aag tac cga gcc gag gcc ctt	1605
Glu Glu Phe Arg Thr Tyr Asn Tyr Pro Lys Tyr Arg Ala Glu Ala Leu	
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Leu Arg His Ala Pro Arg Leu Glu Cys Asp Gly Ala Asp Leu Leu Thr	
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Lys Leu Leu Gln Phe Glu Gly Arg Asn Arg Ile Ser Ala Glu Asp Ala	
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Met Lys His Pro Phe Phe Leu Ser Leu Gly Glu Arg Ile His Lys Leu	
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Gly Gly Arg Gly Ile Asp Lys Thr Asn Gly Val Pro Glu Gln Ile Gly
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Leu Asp Glu Ser Gly Gly Gly Gly Gly Met Thr Leu Gly Glu Ala Pro
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Thr Arg Val Ala Pro Gly Glu Leu Arg Ser Ile Arg Gly Pro Leu Ser
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Ser Ala Pro Glu Ile Val His Glu Asp Met Lys Met Gly Ser Asp Gly
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Glu Ser Asp Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro
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Val Arg Val Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu

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Lys Leu Glu Thr Tyr Ile Lys Leu	Asp Lys Leu Gly Glu Gly Thr	Tyr
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Ala Thr Val Tyr Lys Gly Lys Ser	Lys Leu Thr Asp Asn Leu Val	Ala
180	185	190
Leu Lys Glu Ile Arg Leu Glu His	Glu Glu Gly Ala Pro Cys Thr	Ala
195	200	205
Ile Arg Glu Val Ser Leu Leu Lys	Asp Leu Lys His Ala Asn Ile	Val
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Thr Leu His Asp Ile Ile His Thr	Glu Lys Ser Leu Thr Leu Val	Phe
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Pro Gln Asn Leu Leu Ile Asn Glu	Arg Gly Glu Leu Lys Leu Ala	Asp
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Phe Gly Leu Ala Tyr Ala Lys Ser	Ile Pro Thr Lys Thr Tyr Ser	Asn
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Glu Val Val Thr Leu Trp Tyr Arg	Pro Pro Asp Ile Leu Leu Gly	Ser
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Pro Lys Tyr Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu
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Cys Asp Gly Ala Asp Leu Leu Thr Lys Leu Leu Gln Phe Glu Gly Arg
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Asn Arg Ile Ser Ala Glu Asp Ala Met Lys His Pro Phe Phe Leu Ser
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gagctgcaag aggctgagct gactctaccc agcctgggga aaccctataa gtcactcatg 180
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 35 40 45

Leu Glu Pro Thr Ile Leu Asp Asn Glu Asp Ser Asp Thr Lys Lys Ser
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 Met Tyr Thr Asn Gly Tyr Asp Glu Glu Ile Tyr Tyr Ile Gly
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 Gly Lys Arg Val Phe Leu Thr Pro Lys Ala Trp Pro Phe Pro His Ser
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 Ala Pro Glu Ile Val His Glu Asp Met Lys Met Gly Ser Asp Gly Glu
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 agt gac cag gct tca gcc aca tcc tca gat gag gtg cag tct cca gtg 672
 Ser Asp Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro Val
 50 55 60
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 Arg Val Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu Asp
 65 70 75
 atc aac aaa tgc ctg tca cta cca gct gac ata cgg ctg cct gag ggc 768
 Ile Asn Lys Cys Leu Ser Leu Pro Ala Asp Ile Arg Leu Pro Glu Gly
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 tac ctt gag aag ctg acc ctc aat agc ccc atc ggt gat aag cct ctt 816
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 Ser Arg Arg Leu Arg Pro Val Ser Leu Ser Glu Ile Gly Phe Gly Lys
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 Leu Glu Thr Tyr Ile Lys Leu Asp Lys Leu Gly Glu Gly Thr Tyr Ala
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Thr Val Tyr Lys Gly Lys Ser Lys Leu Thr Asp Asn Leu Val Ala Leu	
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Arg Glu Val Ser Leu Leu Lys Asp Leu Lys His Ala Asn Ile Val Thr	
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Leu His Asp Ile Ile His Thr Glu Lys Ser Leu Thr Leu Val Phe Glu	
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Gln Asn Leu Leu Ile Asn Glu Arg Gly Glu Leu Lys Leu Ala Asp Phe	
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Gln Leu His Phe Ile Phe Arg Ile Leu Gly Thr Pro Thr Glu Asp Thr	
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Trp Pro Gly Ile Leu Ser Asn Glu Glu Phe Arg Thr Tyr Asn Tyr Pro	
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Lys Tyr Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu Cys	
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Gly Glu Arg Ile His Lys Leu Pro Asp Thr Thr Ser Ile Phe Ala Leu	
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Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro Val Arg Val
 50 55 60

Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu Asp Ile Asn
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Lys Cys Leu Ser Leu Pro Ala Asp Ile Arg Leu Pro Glu Gly Tyr Leu
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Glu Lys Leu Thr Leu Asn Ser Pro Ile Gly Asp Lys Pro Leu Ser Arg
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Arg Leu Arg Pro Val Ser Leu Ser Glu Ile Gly Phe Gly Lys Leu Glu
 115 120 125

Thr Tyr Ile Lys Leu Asp Lys Leu Gly Glu Gly Thr Tyr Ala Thr Val
 130 135 140

Tyr Lys Gly Lys Ser Lys Leu Thr Asp Asn Leu Val Ala Leu Lys Glu
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Ile Arg Leu Glu His Glu Glu Gly Ala Pro Cys Thr Ala Ile Arg Glu
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Val Ser Leu Leu Lys Asp Leu Lys His Ala Asn Ile Val Thr Leu His
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Asp Lys Asp Leu Lys Gln Tyr Leu Asp Asp Cys Gly Asn Val Ile Asn

210 215 220
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 Ala Tyr Ala Lys Ser Ile Pro Thr Lys Thr Tyr Ser Asn Glu Val Val
 275 280 285
 Thr Leu Trp Tyr Arg Pro Pro Asp Ile Leu Leu Gly Ser Thr Asp Tyr
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 Ser Gly Gln Ile Asp Met Trp Gly Val Gly Cys Ile Phe Tyr Glu Met
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 Ala Thr Gly Arg Pro Leu Phe Pro Gly Ser Thr Val Glu Glu Gln Leu
 325 330 335
 His Phe Ile Phe Arg Ile Leu Gly Thr Pro Thr Glu Asp Thr Trp Pro
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 Gly Ile Leu Ser Asn Glu Glu Phe Arg Thr Tyr Asn Tyr Pro Lys Tyr
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 Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu Cys Asp Gly
 370 375 380
 Ala Asp Leu Leu Thr Lys Leu Leu Gln Phe Glu Gly Arg Asn Arg Ile
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 Ser Ala Glu Asp Ala Met Lys His Pro Phe Phe Leu Ser Leu Gly Glu
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 Arg Ile His Lys Leu Pro Asp Thr Thr Ser Ile Phe Ala Leu Lys Glu
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A'
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